E. FOLSOM

The Potato News Bulletin

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The Potato Association of America

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ANNOUNCEMENTS

The writer is very grateful to those who responded so splendidly to an appeal for contributions for this number of **The Potato News Bulletin** and also to the advertisers. This fine spirit of co-operation is making each issue of this publication better than the preceding one. Let us keep up the good work and move onward and upward. There is still room for big improvement in all of the activities of this association.

There are those who have had similar experiences to Dr. Weiss and Prof. Werner. The former gives in this publication an excellent report of his investigating trip through Pennsylvania and New York. The latter reports a remarkable account of his observations while on the Annual Western Nebraska Tour. Both of these articles contain food for thought. The two articles on ventilated storages are very valuable and appropriate at this time. There are other contributions in this publication on a par with these. The point the writer wishes to make is that there are others who can contribute just as worth while information. Let us hope that they are planning to send it in for the next issue. The few sentences giving the growing conditions, or the marketing of the crop are valuable. These short potato notes add great value and interest to our paper. No reader should hesitate to send in an account of the crop for his district. **The Potato News Bulletin** should be the medium of exchange of ideas of every one interested in the production and marketing of potatoes.

During the last twelve months the membership of The Potato Association of America has more than doubled. Nevertheless, our membership should be several times greater. How to increase it to this extent is a big question. Suggestions on this point will be welcomed by the writer. Would written statements from the readers giving their opinion of this new publication help in securing

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new members? At any rate the writer would appreciate such statements. In doing so do not hesitate to offer constructive criticism. Remember that this is your publication. You are one of its financiers, one of its contributors and one of its readers.

Walter M. Peacock.

POTATO NOTES

British Columbia.—The potato crop is much below the average this year. The acreage is reduced and the yield will be smaller on account of the very unfavorable season. From present appearances the crop will not be over 50 per cent of the average for the whole province. Some districts may have 60 per cent of a crop while others are almost a complete failure.

The potato crop is maturing earlier than usual partly on account of drought and partly on account of disease. Mosaic has been more prevalent this year and wilt is showing up now very badly in many districts.

The certified seed potato work is progressing favorably and the second field inspection is almost completed. From present indications a larger percentage of the crops is coming up to the standards than has been the case in previous years. Growers are beginning to realize the necessity for early and constant roguing for best results.

The writer had the pleasure of a visit from Dr. Schultz of Maine and Dr. MacMillan of Colorado recently. They seemed quite pleased with the certified seed fields which they saw on the southern part of Vancouver Island. From here a trip was made over to Mt. Vernon in the State of Washington where the experimental plots under the supervision of J. E. Currey, State Seed Inspector, were visited.— **C. Tice, August 25.**

Idaho.— Ashton is in the heart of the seed-potato growing district of Idaho. Seed is grown at an elevation of 5000 to 6000 feet. Continued effort to raise better seed has resulted in 80 per cent of the fields passing 99 per cent free from contagious disease this year.

Unusually dry weather and lack of water for irrigation makes a 60 per cent normal crop a very conservative estimate.

The Netted Gem is the principal variety grown here, as the white and red varieties have a great tendency to blister-scab in spite of every effort that has been tried so far to prevent it.

The writer and the University of Idaho co-operating, tried sulphur experiment for two years, even sending to New Jersey for inoculated soil to mix with the sulphur but were unable to secure any beneficial results.

We are at the west entrance to the Yellowstone Park and many tourists from the East visit our fields and comment on the wonderful fields of potatoes.

The Idaho Netted Gem, or Russett, as more familiarly known, are known all over the United States and need no introduction to those who have ever tasted them.— **A. J. Johnston, August 23.**

Illinois.—We have a wonderful bunch of Triumphs here in Northern Illinois. They were planted on land that never grew potatoes before. It has been estimated that if dug now they would yield 250 bushels per acre. Only one per cent of mosaic has been noticed in these Triumph seed potato fields. They are being sprayed regularly and thoroughly.— **E. P. Miller, August 27.**

Kansas.— The writer is leaving for a trip to Minnesota to look over the potato fields near Moorehead. The Chamber of Commerce at Moorehead is financing the trip for Professor Fitch of Iowa and myself to spend a few days with them on their fields with the idea of improving seed conditions for the southern territories.

The Kaw Valley potato deal has shown considerable improvement over past years in that to date about fifteen hundred cars have gone out as U. S. Grade No. 1. The market has been from fifteen to twenty cents higher on the U. S. Grade No. 1 and the trade has been satisfied when they got the inspected stuff. However, there is considerable shipment going out in the same old way which is discouraging the buyers and jobbers alike in handling Kaw Valley graded potatoes.— **E. A. Stokdyk, August 18.**

Michigan.— The potato acreage has been reduced about 4 per cent over that of last year. Late plantings show poor stands while early plantings are much more uniform and thrifty. The cold, wet weather of late June and early July caused a lot of seed to rot in the ground and gave Rhizoctonia a chance to work on young shoots before they got out of the ground. Blackleg is a serious trouble in the northern part of the state, especially through the Upper Peninsula. Many fields in this section are showing as high as 20 to 30 per cent of blackleg infection. The rainfall at the Upper Peninsula Experiment Station for the week of August 3rd was 3.2 inches with average mean temperature of 65° F. Should this weather continue, late blight is very liable to start. Due to the cool, moist weather the prospects of a good yield on early planted stock is almost assured unless an early fall frost checks them before the first of September. Leaf hopper are generally very scarce. They appear in the southern part of the state around July 20th. Unless much more favorable weather conditions prevail for their increase soon they will not cause any appreciable loss to the crop this season.

The season has been favorable for bringing out mosaic characteristics in Rural stock, and the certified seed growers have been roguing their fields very carefully of any of these suspected plants. In fact they have been taking out all weak or off-type plants and saving only those with normal healthy foliage. While the acreage of certified seed listed this year was smaller than last year, the percentage of rejections on first inspection is smaller and the final

acreage may be somewhere near the same. Considerable increase in use of corrosive sublimate was noted this year. A concerted effort by the growers to better their quality was manifested by earlier planting, using better seed, and seed treatment.— **J. W. Weston, August 19.**

Minnesota.—Kittson County growers are this year applying for certification on better than 1700 acres of potatoes; this out of a total of 9400 acres grown in the county. Ten years ago there were only 600 acres of potatoes in the county. Then the Farm Bureau came into the county and with it a campaign for better seed, seed treatment and better cultural methods. As a result the potato industry has advanced even during the past years of low prices. It has advanced even during these years because the certified seed growers have received prices high enough to pay them over the cost of production. Last year the 29 growers certifying their potatoes sold 50,000 bushels at a premium of $19,000 above common stock. This year 71 are applying for certification.

The first corrosive sublimate was used in the county in 1914. In 1918 only 38 pounds were used. In 1922, 1091 pounds. This dropped in 1923 and 1924, due to some treating with hot formaldehyde. 85 per cent of the acreage of the county is planted with treated seed. One hundred twenty-five growers have seed plots.

The Early Ohio variety comprises 90 per cent of the acreage grown in Kittson County. Irish Cobblers, though, are coming in, and the certified acreage of Cobblers is one-half of the Ohio acreage this year. Triumphs are being grown by a few, but the acreage is thus far very limited.

Sales were made direct to growers last year, the stock going into twelve states. This year practically the full acreage of the county is signed up with the Minnesota Potato Growers Exchange and will be sold through their Seed Department at the head of which is W. V. Longley, who has been county agent in Kittson County for seven years, and in the agricultural work in the county for ten years.—**A. G. Tolass, August 25.**

Deerfield, N. J.— With ideal weather for potato digging the past week growers have been marketing their crop at a rapid rate; as high as thirty cars were loaded in one day at Deerfield. The yield is high in this section and the stock is first class. Prices are very unsatisfactory, ranging from 80 cents to $1.20 per hundred pounds. The crop is about two-thirds harvested. The late or second crop seed is doing nicely with almost a perfect stand. Those planted late were slow in coming up, owing to the cool weather. The thermometer fell to 55 degrees several nights. We had a heavy fall of rain Monday afternoon and night. With plenty of moisture potatoes should make a rapid growth.—**J. Norton Woodruff, August 27.**

Monmouth County, N. J.— The quality of potatoes from Mon-

mouth County this year is probably the finest ever shipped from this section. During the week of August 18 harvesting was more or less rapid as from 200 to 350 cars moved per day. Prices started early in the week at around $1.90 per 150 lb. sack received by the farmers, and closed around $1.35, which caused a slackening of movement the latter part of the week.

The market opened up on Monday, August 25, with a brisk demand, but prices were about where they closed down the previous week. We are looking for somewhat better prices, however. Potatoes were never more free from scab and are all a brighter color than usual. Everything moved so far has been Irish Cobblers. The few Giants from Monmouth County will in no way affect the market.

Potato pickers are plentiful and some to spare. The average price per barrel for picking is 10 to 12 cents.

An activity of special note this year is the action of the Monmouth County Farmers Exchange of Freehold which is instructing its loading agents in the requirements of U. S. Grade No. 1, under a Federal-State inspector. A bonus is being offered by the Exchange for a special brand known as the Triangle over common or average stuff.— **Ellwood Douglass, August 27.**

New Jersey.— Monday, August 25, Irish Cobblers in Monmouth County sold for $1.65 per sack. Due to the low prices, the growers are proceeding slowly with the marketing of the crop. In many cases the yield of Irish Cobblers is very good, some growers digging 125 bbls. per acre. This is the exception, however, and while yield of 90-100 bbls. are by no means uncommon, in many instances it is well under this. Few of the late varieties have been dug, but the indications are that the yield of Green Mountains has been greatly reduced, owing to the very dry weather in the late season. In several variety tests the average yield of a number of strains of Irish Cobblers was approximately 100 bushels greater than that of the Green Mountains included in the test.

The central Jersey growers are making a special effort this year to put up a good grade. This movement is being fostered by a committee from the Experiment Station, State Department of Agriculture and the Farm Bureau Federation. This committee has employed a field man who is spending his entire time in the field working with the growers and dealers. The movement is meeting with considerable success.

There is less scab in New Jersey than there has been for a number of years, this despite the fact that fewer of the American Giant and more of the susceptible varieties have been planted. This is believed to be due to the fact that the early wet season inhibited the development of the scab organism. The fact that the crop is relatively free from scab has been an important factor in enabling the growers to meet the U. S. grades.

Spindle-tuber is present to a considerable extent in some lots of

seed. One instance was observed last week where 20 per cent of the crop was very much off type due to this disease. In another test plot a lot of certified Green Mountains showed 20 per cent spindle-tuber. While this was a low yielding strain, in most every instance certified seed has given exceptionally good results this year. In one test of 40 lots of certified seed the average yield was 293.6 bus. per acre as compared with 232.0 bus. from several lots of non-certified seed.

Seed treatment has given good results. County Agent Bowen of Middlesex County reports increases amounting to 38 bushels per acre as the result of disinfecting seed infected with rhizoctonia in mercuric chloride. County Agent Crissey of Salem County reports similar results. Only one of the spray tests have been dug to date. In this test, with the Irish Cobbler variety, an increase of 50 bushels per acre resulted from spraying with home-made Bordeaux Mixture.

The late crop planted for seed purposes is coming up very well. Several rains since planting have ensured a good stand and the prospects for a crop are good. To date, 640 acres have been entered for certification, an increase of 200 acres over last year, this despite the fact that the total acreage planted has been considerably reduced. The first field inspection will be made about the second week in September.

The growers of late crop seed potatoes are to conduct a tour Sep. 29-30 to examine the crop. The first day will be spent in Salem and the second in Cumberland County.— **Wm. H. Martin, Aug. 27.**

New York.— At the time of the Annual Potato Tour held on Long Island last June, the crop in both Nassau and Suffolk Counties was in excellent condition. Both the quality of the seed used and the stand of plants was better than in recent years. Unfortunately there has been practically no rain whatever on the Isalnd since that time. As a result the early crop of Cobblers and many of the fields of earlier planted Green Mountains have died prematurely. Latest reports, therefore, indicate a serious cut in the yield in this territory.

The crop in northern and western New York is in good growing condition at the present date. Sufficient rains have prevailed in both of these sections to maintain a steady growth. No blight has come to the writer's notice in either of these sections up to date. Owing to lateness at which much of the acreage in western New York was planted, yields will depend very much upon the time of occurrence of the first killing fall frost.

Summer potato field tours are now at their height throughout the state. Through the agency of the several County Farm Bureaus in co-operation with the College of Agriculture, these tours are now an annual institution resulting in very effective instruction for the grower often farthest removed from population centers. Probably at least one-half of the counties in New York now stage

these tours.— **E. V. Hardenburg, August 15.**

Nova Scotia.— The spring season was favorable for planting potatoes and areas up to the average were planted. Growth was vigorous and in spite of continued dry weather to the middle of June, when there was a rainfall of two inches, the growth was all that could be expected. Dry weather continued to the 11th of August and the effect of drought was decidedly noticeable and early varieties planted early wilted badly, resulting in a small yield of marketable tubers. The later varieties have picked up and the prospect is that a good crop of Green Mountain and Garnet Chili will be harvested.

Considerable interest has been aroused in the matter of disease free stock and the planting of certified seed stock is increasing greatly. Growers are finding it profitable to get seed free from mosaic and leaf roll, and doubtless in a few years only such seed will be grown. Interesting tests conducted at this station by Mr. R. P. Gorham of the Division of Entomology show the efficiency of lime nicotine dust for the control of the potato aphis which is the principal agent in the spread of mosaic and other obscure diseases. A count of the dead aphids under one plant on a measured area of 30" x 16" with plant in center was 925, and only 2 living aphids could be found on the plant. One plant occupying a space 30 by 30 inches had under it 1735 dead aphids, and only one living aphid could be found on the plant. Total counts show 98.5 per cent killed by one application applied at 9:30 a. m. The nicotine dust is applied with power duster and under a sheet attached to the dusting machine which followed over the plants. The machine was drawn by a pair of horses, and four rows were treated at one time. — **W. S. Blair, August 26.**

Ohio.—The acreage of late potatoes in Ohio is normal. The stand is fair. Prospective crop about eighty per cent of average.

Due to heavy rains at planting time the stands vary from poor to good. The average date of planting for northern Ohio was two weeks later than normal, or about July 1st to the 8th.—**N. W. Glines, August 27.**

Ontario.—Field days for potato growers have been held in the districts of Pontypool, Burlington, Barrie (2 days), and Manitoulin Island this month. The purpose of the meetings was to instruct the growers in the proper methods of roguing out diseased plants, spraying, and seed treatments. They have been well attended. It is hoped that these field day demonstrations will result in improved crops next year. Our best attendance was in Barrie District where 85 growers attended the first day and 45 the second day. When the meetings were arranged for the evening, 6 p. m. in stead of the morning or afternoon, there were better attendances. An opportunity was given to adjourn to a school house or other meeting place for a further discussion if the growers requested it.

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A one-day potato tour has been arranged for the 26th in the Thunder Bay District. Growers from Dorion, Murillo, Slate River and Hymers will meet at the Industrial Farm in the forenoon and inspect the various plots there. Lunch will be provided through the courtesy of Mr. McElroy, Superintendent, after which the potato fields in the Slate River Valley will be visited. Growers will have the opportunity to see for themselves the benefits derived from spraying, roguing, etc.

Weather conditions in our northern seed growing districts have been poor this year. Very dry, cloudy and cold weather has prevailed until a few weeks ago when it turned very wet and cool. The result is the fields are very backward and are only just in full bloom. Frost has already been reported in Burris, Rainy River District, where the tops are frozen down on many farms. Slight frost injury in the other districts has not injured the plants to any extent, so if the weather improves and there is good growing weather for the next few weeks there will yet be a crop but hardly up to the average. There will be a scarcity of the best seed in Ontario again this year, unless conditions improve considerably.

The seed treatment demonstrations with corrosive sublimate carried out this spring in the Thunder Bay District have been very successful. Very little blackleg appears in the treated fields, whereas as high as 30 per cent has been found in some untreaated plots. Rhizoctonia injury to plants is showing up much more in the untreated plots than in treated ones, though the average is higher all round owing to the weather being so favorable for its development. Mosaic shows up very well this season. This will enable growers to rogue more thoroughly than in other years.

Aphids are apparently more numerous this season in the North. Leaf hoppers and Colorado potato beetles are not so numerous as last year, although a few districts report them plentiful.

Most of the certified seed potatoes grown in northern Ontario are being used by the growers in the southwest part of the province, several hundred miles south of where it is grown. Very good crops are obtained from this immature seed and most of the growers who use this seed purchase it from the same source each year. At present very little is left over for export. The northern growers intend doubling their acreages next year. There is a good demand from outside localities which have previously tried out carlot shipments from the northern growers.—**J. Tucker, August 26.**

Vermont.— The results of the first inspections of Vermont fields show that 689 acres are entered. This is an increase of about five per cent over 1923. Of this total acreage there are 511 acres of Green Mountains, 165 acres of Irish Cobblers, 12 acres of Russet Rural and 1 acre of Triumphs. The Irish Cobbler acreage shows an increase of 27 per cent over 1923.

Dry weather about planting time resulted in some poor stands, especially where large fertilizer applications were made. There

was evidently some fertilizer injury of sprouts due to unsatisfactory mixing of the fertilizer with the soil.

Weather conditions during July and August have been quite favorable in the Western and Northern parts of the state, while in the Connecticut Valley, fields have suffered from dought. The average yields will be about normal according to present indications.

Practically no late blight has been seen and fields are sprayed more thoroughly than ever before. A very large percentage of the inspected fields have passed the first inspection, due to the local distribution of the most disease free strains for planting.— **Alfred H. Gilbert, August 20.**

NOTES ON RECENT LITERATURE

ANONYMOUS.— **Missing potato hills.**— ***Fruit Trade Journal and Produce Record, 71: 19. August 9, 1924.***— The author gives an account of an experiment that is being conducted at the New York State Agricultural Experiment Station, Geneva, N. Y. Loss caused by a missing hill is partly made up by an nicrease in the yield of the two plants on either side of the vacant space. With hills planted 15 inches apart in the row and with rows 36 iches apart, the plants in the two hills adjoining a blank space in a row gave a sufficient increase to make up 53.8 per cent of the loss of the missing hill. When this experiment was first conducted the results showed that 46.4 per cent of the loss of a missing hill was made up by the two hills on each side of the blank hill. Results show that blank spaces occupying more than one hill did not increase the yield of the adjoining plants as much as did a single missing hill. The results are not considered conclusive on this point.—**Walter M. Peacock.**

ANONYMOUS. — **Regulations for potato warehouses.** — ***U. S. Dept. of Agr. Service and Regulatory Announcements No. 83. June, 1924.***— The regulations are given under the following headings:—warehouse licenses, warehouse bonds, warehouse receipts, duties of licensed warehouseman, fees, licensed inspectors and weighers, potato inspecting and classification, appeal of grades, and miscellaneous. The United States warehouse act as amended July 25, 1919, and February 23, 1923, is printed in the back of this publication.—**Walter M. Peacock.**

EVERETT, CHARLES H.—**Tour Wisconsin Potato Fields.**— ***The Wisconsin Agriculturist, 48: 35, August 30, 1924.***— On the first day a special field program was held on the Spooner Branch Experiment Station Farm. Here the variety plots and experimental potato fields were inspected. The author gives an account of the

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different farms visited on the tour in northern Wisconsin from the fourteenth to the twentieth of August. He states that 1000 tubers will be obtained from twenty Wisconsin seed potato growers and will be tested at Madison by the tuber index method during the winter. The seed potato industry is growing and 530 applications for field inspections have been made this year. More of the Wisconsin potato growers are using commercial fertilizer each year. The potato crop looks good throughout northern Wisconsin this year.—**Walter M. Peacock.**

Goss, R. W.— Potato wilt and stem-end rot caused by Fusarium eumartii.— ***Nebraska Agr. Exp. Sta. Res. Bul 27. — 83 p. illus. 1924.***— Wilt is one of the most serious potato diseases in Nebraska, particularly in the western part, ranking next in importance to mosaic and spindle-tuber. In favorable years for the disease half the plants in certain fields may be attacked, and there is a further loss in storage. The fungus Fusarium eumartii was not known to be present in Nebraska prior to 1923, but is now shown to be the principal cause both of wilt and stem-end rot. This is evidently a disease of long standing in this state and probably elsewhere, though F. eumartii has heretofore been reported only from New York, Pennsylvania, and Ohio. The causal relation of this fungus to both wilt and stem-end rot in Nebraska has not hitherto been determined, largely because in both type of disease the primary pathogen becomes overrun by secondary parasites including several species of Fusarium, which are more readily isolated from diseased material than F. eumartii, and have therefore been regarded as of most importance. F. eumartii was readily recovered from roots, but portions of the stem or tubers showing advanced rot usually yielded secondary species of Fusarium.

Infection by F. eumartii may cause stem and root rot, but the organism is not primarily a vascular parasite. It causes wilting by the production of a toxic excretion. Infection occurred at soil moisture contents ranging from low to high. The progress of infection is favored by abundant soil moisture, but wilting is most prevalent in dry soil. The optimum temperature for the disease under controlled conditions is 20° to 25° C. and the thermal range is 12° to 30°. The fungus is therefore capable of attacking the potato even in environmental conditions favorable to the latter, thus differing from F. oxysporum which mostly attacks plants weakened by high temperature or otherwise.

The disease is transmitted both in the seed and in soil, the amount of infection from either source being about the same. In storage the disease can be checked by keeping the temperature below 10° C. (40° F.) and the humidity as low as possible. The control measures recommended are: rejection for seed purposes of potatoes from fields in which wilt and stem-end rot are to any considerable extent present, and long rotation when the soil becomes infected.—**F. Weiss.**

MARBLE, L. M.— Ventilated storage for potatoes.— *Fifth report of the Marble Laboratory Inc., Canton, Penn, June, 1924.*— The author emphasizes that for the successful storage of potatoes it is essential that rot and mould be avoided, and the simplest method of accomplishing this is to keep the surface of the potatoes dry. Rots and moulds can not form on dry surface because they have no culture ground. Sweat pockets furnish places for moulds and rots to start. When the surface of potatoes is kept free from excessive moisture or kept dry, rots and moulds do not have an opportunity to develop and the storage will be free from loss due to these causes.

According to the author, a temperature of 38° to 40° F. has proven to be correct for successful storage of potatoes. Higher temperatures are not harmful during October and November. Below 38° F. the starch-sugar change commences. Above 38° F. the respiration rate rises rapidly.

The changes in humidity from 65 per cent during cold weather to 95 per cent in wet weather do not induce sweating nor seem harmful to the potato. Variations in humidity as occur in ordinary winter weather may be disregarded. Dirt floors are preferable for potato storages. Humidities lower than 65 per cent should be avoided. Shrinkage is to be associated with immature skin development incident to digging before full maturity.

Ventilation was used to control the temperature of the storage and to keep the surface of the potatoes dry. The air was changed from 4 to 6 times per hour. In cold weather the air was tempered to prevent chilling the potatoes. Nevertheless, frost proof construction is essential for potato warehouses. In bins sweat pockets cannot be avoided and these cause deterioration of potatoes in storage. The author recommends that potatoes be stored in crates, hampers or bags. When bags are used wooden strips should be placed between the tiers of bags. The report contains 14 splendid full-page illustrations.—**Walter M. Peacock.**

SALAMAN, R. N.— A leaf index as a help to the identification of potato varieties.— *The Proceedings of the Cambridge Philosophical Society* (*Biological Sciences*), 1: *2, April, 1924.*— The author as the Chairman of the Potato Synonym Committee of the National Institute of Agricultural Botany has seen experts under certain circumstances fail to recognize well known varieties such as the Up-to-date and the Majestic. For this reason a more accurate means of identification was sought. The leaf index was found to be constant with a small variation for various potato varieties. The lateral leaflets vary less in shape than the terminals. Therefore the lateral leaflets are used in identifying varieties. Young leaves and secondary growth must be avoided in calculating the leaf index of a variety. The least number "n" of leaflets required to arrive at a fair estimation of the leaf index of a particular variety was judged to be such a number that the probable error of the

mean of "n" observations when mutilplied by 3 should be well below 2. A convenient value for "n" fulfilling this condition is 20. The author has shown the leaf index to be constant with a small variation for the various potato varieties. He states it would not therefore be surprising if it were found to be controlled by hereditary factors and to behave in accordance with the Mendelian law.

SUMMARY

The first lateral leaflet on the left of the mid-rib of each leaf is measured, and its index breadth/length x 100 calculated.

The Leaf Index of a variety must be ascertained from adult leaves on a healthy plant.

The younger leaves where the long axis is less than two-thirds its final length will have a somewhat higher index than the normal.

Leaves of secondary growth have, at first, a higher index.

Leaves affected with slight mosaic mottling have a reduced index.

The variation of the index within any given variety is a normal one and represented by a normal frequency curve.

The mean value of the p. e. for one observation when 56 varieties are examined of each of which a minimum of 20 leaves have been measured =2.36.

The p. e. of the difference of two means of 20 each is .74. A difference of two units in the Index may be considered as indicating odds of about 18:1 against the two varieties being the same, and a difference of 3 units as being almost certain evidence of such distinction, the odds being over 140:1.

Of 65 varieties of which the index was measured, the value of the latter varies between 50 and 72.

Neither the place of origin of the seed tubers, nor the locality where the plants are raised have any effect on the Leaf Index, always providing that the plants are healthy.

The Leaf Index is a constant for each variety.

There is some correlation between early varieties and a low index, and late varieties and a high index.

The Leaf Index has given valuable evidence as to the identity of suspected synonymous stocks growing for trial at Ormskirk.

Walter M. Peacock.

SERRANR - BELLENOUX, E. — Cent mille kilos de pommes de terre a l'hectare. (Hundred thousand kilograms of potatoes per hectare).— *80 p. Librairie Des Sciences Agricoles, Paris, 1923.* — The author relates how to grow nearly 1500 bushels of potatoes per acre. The following subjects are discussed in this publication: History and description of the potato, varieties, fundamental principles of culture and fertilization, choice of soil and climate, profits gained by the application of industrial and scientific methods, diseases and their control, potato alcohol, etc.— **Walter M. Peacock.**

TICE, CECIL.— The British Columbia Potato.— *B. C. Dept. of Agr. Bul. 86. 84 p. illus. 1924.*— In this booklet the author has thoroughly covered the subject of producing, storing and marketing potatoes in British Columbia, Canada. It contains 77 good illustrations. The author discusses the following phases of the potato:—history, botanical characters, quality, food value, cooking, production, consumption, potato-growing areas of British Columbia, climate, relation between temperature and yield, soils, rota-

tion, manures and fertilizers, preparation of the land, early potatoes, seed, planting and cultural methods, irrigation, harvesting, picking, sorting and grading, storage, marketing, disposal of cull potatoes, preparation of cars for shipping potatoes, cost of production, field-crop competitions, improvement of varieties, classification of varieties, preparation of exhibits, insect pests, potato diseases, general principles in the control of potato diseases, disinfection of seed potatoes, spraying, spray mixtures, regulations of the sale of certified seed potatoes, British Columbia imports and exports of potatoes, and potato recipes. The author has done himself credit in this publication. It should be of a great value to potato growers in that section of the country and also helpful to others interested in potato production.— **Walter M. Peacock.**

WAUGH, FREDERICK V.— **Forecasting prices of potatoes.** — *Hints to Potato Growers.*— 5: *4, August, 1924.*— The method of predicting prices of New Jersey Irish Cobbler as used by the author is based on the "Theory of Probabilities." The basis of this theory is that everything that happens or ever will happen is caused by something else that has already happened. The four important factors used in calculating the prices of potatoes are:—The estimate of potato production in the United States; the trend of potato production in the United States; the trend of Irish Cobbler prices; and the general price level. The author has found that the difference between calculated prices and actual prices is an average of 10 per cent for the past twenty-two years. **—Walter M. Peacock.**

MISCELLANEOUS PAPERS

THE LATE POTATO OUTLOOK

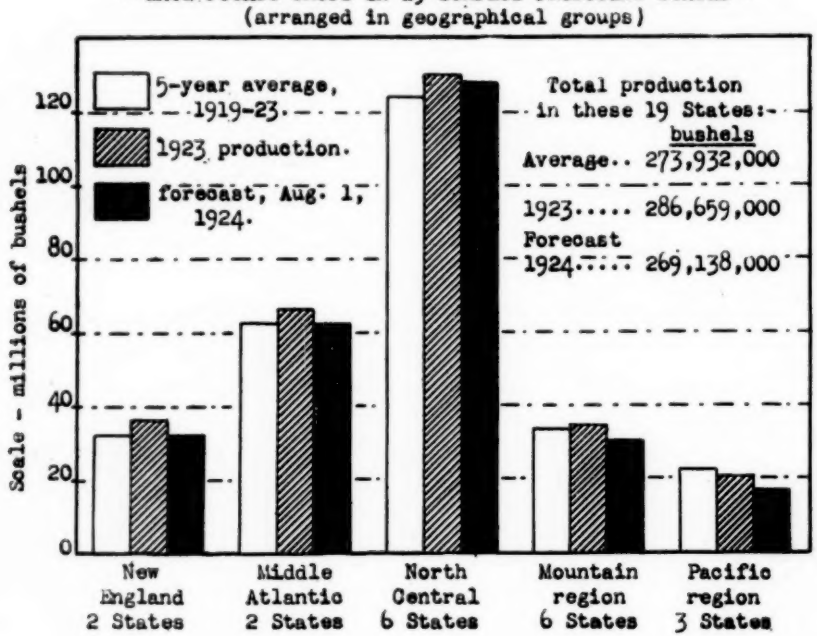
(Contribution from the Fruit and Vegetable Division, Bureau of Agricultural Economics, U. S. Dept. of Agriculture.)

"Keep the little ones at home," is the slogan of one of the large co-operative associations of potato growers, and the advice is good if farmers are to market their crop on a profitable basis. It looks as if total production in the leading late potato states will be up to average even though somewhat less than last year. Careful grading and distribution, therefore, are essential. Culls can be used more profitably on the farm than in distant markets; very small potatoes should be kept at home. Shipping-point inspection doubtless will be conducted more widely this fall and winter than ever before. Growers and shippers of late potatoes will find valuable suggestions in Farmers' Bulletin 1317, "Marketing Main-Crop Potatoes," which may be had on application to the U. S. Department

of Agriculture, Washington, D. C. The old question: "Should I sell my potatoes early or hold them for the later market?" is at least partly answered in this bulletin.

As digging progresses in the important potato states, the Government's monthly forecasts are carefully revised in accordance with actual yields. By the time this article is published the September crop estimate probably will be available. The September figures by states should be compared with the August forecast, so that increases and decreases may be noted and definitely located. The August total for the United States was increased to 398,821,000 bushels, a gain of nearly 26,000,000 bushels or 7 per cent over the July estimate, but still 13,500,000 bushels below the 1923 crop. This, of course, includes both the early and the late potato states.

Considering now only the 19 surplus producing states,— Maine, Vermont, New York, Pennsylvania, Michigan, Wisconsin, Minnesota, North Dakota, South Dakota, Nebraska, Montana, Wyoming, Colorado, Utah, Nevada, Idaho, Washigton, Oregon, and California,— the August forecast of 269,138,000 bushels shows an increase of about 17,000,000 over the July figure. If proportionate gains were made the next month, the September forecast doubtless will bring this group of leading states well above the average of the last five years, which was 273,932,000 bushels, and push the total nearer to the 1923 output of 286,659,000 bushels. It is not expected, however, that the crop will be anywhere like the huge 1922 production of 325,500,000 bushels. The accompanying chart brings out these comparisons, as well as the relative importance of the geographical sections.



By August 1, crop prospects had greatly gained in New York, Pennsylvania, Michigan, Wisconsin, Minnesota, and North Dakota, but Maine showed a decrease of a million bushels. Smaller losses occurred in Colorado and Oregon. The outturn in the New England and Middle Atlantic regions was expected to be just about the average of the last five years. Conditions in the North Central States indicated larger than average crops, and Wisconsin, Minnesota, and North Dakota may have more potatoes than in 1923. Farther west, conditions were not so good, and the Mountain States and Pacific Coast region not only expected fewer potatoes than last year, but less than the recent average. Water shortage affects most of the West, and those districts possibly have not forgotten the financial losses of the 1922-23 season.

Shipments of potatoes during August averaged about 600 cars daily, which is slightly more than during the same period a year ago. The increase was due chiefly to the heavy movement from eastern intermediate States. Markets generally were dull and weak, some varieties of potatoes showing notable declines. F. O. B. prices were discouraging to growers in many shipping sections, as values everywhere ranged scarcely more than half those of late August, 1923. Sacked Irish Cobblers sold from $1.10 to $1.35 per 100 pounds f. o. b. New Jersey points; around 80 cts in the Kaw Valley of Kansas on a cash-track basis, and slightly higher than that figure on the western slope of Colorado. The Kearney district of Nebraska quoted Early Ohios and Irish Cobblers at 80 cents to 95 cents f. o. b. usual terms, the cash price to growers being about 20 cents less. Sacked Rurals were moving slowly in the Caldwell section of Idaho at 65 cents cash track.

With the Government's daily market reports available without charge at temporary field stations in a number of shipping sections and at most of the important city markets, the potato grower and shipper has the advantage of full knowledge of conditions in consuming centers. He is a wise man who follows closely the daily reports of shipments and prices, as well as the monthly crop estimates.

NEW ENGLAND POTATO OUTLOOK SLIGHTLY BELOW AVERAGE

V. A. Sanders.

Potatoes in Maine August 1, have a condition, compared with normal, of 87 against 89 last year and 89 the ten year average. The bulk of surplus production comes from Maine and the outlook there August 1 is for 28,275,000 bushels against 31,992,000 last year and 28,596,000 the average of 1919 to 1923. Condition of the crop in New Hampshire and Vermont is slightly above average and pros-

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pective production somewhat exceeds the 5 year average. Massachusetts, Rhode Island and Connecticut, due to dry, hot weather in July, show condition considerably under average. The outlook is lowest in Connecticut where the early crop has suffered serious damage and the late crop is much reduced.

NEW ENGLAND POTATOES

	Acreage (000 omitted)		Acreage (000 omitted)		Condition August 1			Production in Bushels (000 omitted)		
	1924 in % of 1923	1924	1923	5 yr. av.	1924	1923	10 yr. av.	Forecast Aug. 1, '24	Final 1923	5 yr. av. 1919-1923
Me.	105	130	124	124	87	89	89	28275	31992	23596
N. H.	108	14	13	14	90	88	88	1953	2405	1876
Vt.	108	26	24	25	93	90	90	3627	4320	3396
Mass.	109	28	26	29	80	82	87	3069	4550	3457
R. I.	112	2	2	3	83	90	86	224	330	335
Conn.	115	26	23	24	72	80	87	2340	3565	2771
N.Eng.	106.5	226	212	219	86.0	87.8	88.7	39488	47162	40431

Prospective total production for New England August 1 is 39,488,000 bushels against 47,162,000 last year and 40,431,000 the average of 1919-1923. Should conditions and influences become more favorable it is easily possible for the crop to show material improvement and increase.

A fact worth keeping in mind is that in Maine at least 35 per cent of the acreage was planted with certified seed. New Hampshire and Vermont used important quantities of improved seed, while Massachusetts and Connecticut commercial growers planted certified or improved seed on at least 75 per cent of their acreage and Rhode Island commercial growers on at least 60 per cent. With other conditions reasonably favorable this large use of improved seed forecasts considerably higher yields than would come from ordinary seed.

For New England as a whole the acreage is 6.5 per cent larger than last year. The highest increases are in Southern New England. The August 1 forecast for United States potatoes is 398,821,000 bushels against 412,392,000 produced last year and 390,722,000 the crop average of 1919 to 1923. With general business conditions satisfactory and urban buying reasonably active a United States crop of around 400 millions should sell well at remunerative prices.

SURVEY FOR POTATO WILT IN PENNSYLVANIA AND SOUTHERN NEW YORK

Freeman Weiss

The interesting discovery by Dr. R. W. Goss (elsewhere reviewed in this Bulletin) that in Nebraska the most prevalent cause of wilt and stem-end rot of potatoes is Fusarium eumartii serves to reopen the question of the specific etiology of potato wilt as it occurs in New York and Pennsylvania at the southern limit of the late potato belt. This fungus was originally described from Pennsylvania and has subsequently been recovered periodically from specimens sent to the Pennsylvania Agricultural Experiment Station and to the Federal Bureau of Plant Industry. Its ability to cause a field wilt also has been known and in certain isolated instances severe losses, particularly through stem-end rot, have been ascribed to it, but in general nothing approaching its prevalence and severity in Nebraska has been recognized in the East.

In order to learn more of the various aspects of potato wilt as it occurs in the East, the writer and Philip Brierley of the Bureau of Plant Industry have just completed a tour of the principal potato sections of Pennsylvania and southern New York. They traveled by automobile, and were equipped to make isolations from diseased material directly upon collection, in this way attempting to avoid contamination by numerous saprophytes and secondary parasites which occurs when diseased plants are carried or sent for any considerable distance. Our itinerary covered York, Lehigh, Bucks, Luzerne, Center, Cambria, and Potter Counties in Pennsylvania, and south-central to middle eastern New York, including the Hud-

son Valley. Owing to the general prevalence of a cool and very wet early part of the season throughout this region, wilt was this year found to be greatly overshadowed in importance by rhizoctonia, and in certain sections also by blackleg. However, in a few places, the backward spring and early summer had given way to locally severe droughts accompanied by brief periods of hot weather, though the general temperature level has remained low. Authentic wilt was, however, nowhere found to be prevalent. What was diagnosed from field symptoms as wilt probably due to Fusarium eumartii was found in Center, Lehigh, and Potter Counties, Pa. Verticillium wilt was found in Potter County, and near Gloversville, New York. In York County, Pa., and throughout the Hudson Valley, New York, where wilted potatoes bearing vascular discoloration were found, considerable injury due to the potato stalk weevil (Trichobaris trinotata) and to rhizoctonia also was present. In York County commercial fields of late potatoes showing at least ten per cent of stalk weevil injury were seen, about half the infected plants being nearly dead early in August, and early potatoes in general were still more severely attacked. On many such plants rhizoctonia lesions more or less covered the stem base, and Fusarium oxysporum was found in the vascular bundles.

Professor Blodgett of Cornell University accompanied the party on the trip through New York State, where in the potato sections visited, yellow dwarf was infrequently but consistently found. This complicated the recognition of the early stages of wilt somewhat, though in general the symptoms of yellow dwarf, even in gross aspect, were distinct. Yellow dwarf was not found in Pennsylvania.

About 80 separate isolations were collected which still await identification and determination of pathogenicity.

VENTILATION BY ELECTRIC FANS IN THE DIMOCK ORCHARD SEED POTATO WAREHOUSE

Julian A. Dimock

In planning our warehouse we purposely arranged for less than the accepted amount of ventilating area. Forty degrees below zero is usual at least once in the winter and sixty-five below has occurred within the last half dozen years. With this memory we decided that the fewer openings we had the safer we would be.

The floor space of the warehouse is approimately 48′ x 72′. The house is divided into basement and main floor. There are four intake ventilators 18″ x 18″, two in the basement and two on the main floor at the aisle ends. In the roof are three outlets 18″ x 18″.

The bins are 5′ x 15′ with a six-inch ventilating space completely surrounding them. Four feet from the bottom of each bin is

another removable flooring. After filling the lower half of the bins, these floorings are put in and the upper part then filled. Not more than four feet depth of potatoes is thus possible in any part of the warehouse. It is obvious that not a potato can be more than two feet from ventilation.

The first winter we found more condensation than we considered desirable and so last fall installed electric fans. With a battery of four fans we can increase the circulation of air, by either setting them in front of the air intake ventilators or by increasing the draft through the outgo ventilators. We more frequently keep them in the aisles, simply supplying circulation of the air already in the warehouse. Sometimes we put them directly in front of the bins, sending a current that can be plainly felt through fifteen feet of potatoes.

At harvest time we pay little attention as to whether the potatoes are wet or dry when brought to the warehouse and put in the bins as a fan playing on a bin for a day will thoroughly dry off any moisture which may have come in on the tubers.

If during the winter excess moisture appears on the roof over any bin a fan is set in motion in front of it and within a few hours the ceiling drys off.

Our potatoes never came out in better condition than they did last spring. Out of about 15,000 bushels possibly five bushels were thrown out for rot in the spring. In cutting 1200 bushels for seed we did not find a single black heart or other storage injury and no trouble of the sort has yet been reported to me by any purchaser of our seed.

In cutting several hundred bushels of seed which had been kept in an ordinary cellar there was such a marked difference of texture that the cutters complained of the difficulty in handling the latter. It is only fair to state, however, that the latter gave us as good, or possibly even a better, stand than that which we got from the warehouse-stored tubers.

So far as the observations from a single season go it seems that the installation of electric fans in a seed potato warehouse is as necessary a part of the program as any other feature of construction.

VENTILATED STORAGE FOR POTATOES

L. M. Marble

The study of the life characteristics of the potato at storage temperatures conducted at our laboratory during the winter of 1922-23 by Dr. E. A. Hopkins, now stationed at Cornell University, revealed the respiration response of the potato to changes in holding temperature, and the remarkable acceleration of respiration which takes place when the temperature is reduced from 38° to 32°.

This acceleration is due to the starch-sugar change. When seed held at 38° F. and 32° F. were planted side by side the following spring it was noted that the seed held at 32° F. was three or four weeks later in germination than the 38° F. seed. Evidently this time was required for the reverse sugar-starch change to be complete. There is a delicate balance in the carbo-hydrate characteristics of the potato required for germination. It was not surprising, in view of these facts, that later developments have shown that rot and mold forming on the potatoes during storage definitely diminish the yield of the infected seed, and therefore that proper storage is essential, not only to save waste during storage, but also to obtain full yield from the seed stock.

Storage thus becomes one of the limiting factors for seed germination and deserves the importance which it is receiving from the Department of Agriculture of the State of Pennsylvania. The requirements for successful storage are:

1. Sound, healthy potatoes.
2. Frost-proof construction of the storage house.
3. Control of temperature.
4. Control of humidity.

Control of temperature is necessary to hold the potato at the low point of physiological activity where it will be most completely dormant. The temperature of 38° F. has been found best suited for this purpose.

Control of humidity is necessary to prevent the formation of rots and molds. As it is the humidity of the individual potatoes themselves, rather than the humidity of the air in the open spaces of the storage house, which must be controlled, it is necessary in storing to use an open type of package which will give free access to ventilating air. Slat potato crates are most suitable for this purpose, but bags have been found to be satisfactory when properly stacked with dunnage.

The cheapest and most efficient agency for controlling both temperature and humidity during storage is ventilation, the air being tempered during cold weather so as not to chill the potatoes.

Where the storage is of sufficient size, such as a commercial warehouse holding from 50,000 bushels up, bag or crate storage with forced draft ventilation is efficient and practical. This was demonstrated during the winter of 1923-24 at the warehouse of the Potter Co-Operative Potato Association at Coudersport, Pa. Here a tile warehouse of 75,000 bushel capacity, two-story, under forced ventilation with tempered air, carried bag stored stock through the season with only 4 per cent total waste, including throw-outs from badly sized stock. There was no rot and no mold. Bin stock during the same period showed a waste of 20 per cent due to rot and mold. The air in such a warehouse should be tempered only sufficiently to maintain the proper storage temperature of 38° F. The warehouse should be entirely frost-proof, both side walls and ceiling, so that there will be no condensation. A report of this

work has been prepared by the Marble Laboratory and will be forwarded with out charge to any one writing for the same.

But what about the grower storing individually in lots of from 1000 to 3000 bushels? Forced draft is out of the question for such a storage because of the expense involved. We are working out a solution of this phase of storage in the Marble Laboratory this year, and hope to be able to offer a definite solution. A study of earth temperature and storage temperature and several different forms of ventilation is being carried on by Professor R. D. Anthony of Pennsylvania State College, with the assistance of Mr. Malcom Smith and Mr. R. B. Maxwell, Research Fellows of Peensylvania State College. The study is being directed to ascertain results in seven different typical types of bank storage:

1. A storage built with one end door only.
2. A storage built with a door in each end.
3. A storage built with one end door with ventilating shafts to provide the ventilation.
4. A storage built with one end door, ventilating shafts and also with forced draft with means for tempering the air.
5. A storage built with a door in each end, or a door and window, with ventilating shafts and with forced draft ventilation with means for tempering the air.
6. A storage in which there are no end doors, but ventilating shafts are provided, working in connection with ground ducts.
7. A storage with an outer workroom in which there is a stove, with large communicating doors between the workroom and the cellar and a door opening to the outside air.

In all of these types of construction the potatoes will be stored in crates upon a false floor, formed by boards set one inch apart and supported twelve or fifteen inches above the cellar floor on wooden saw horses. The floor of the cellar is earth.

We believe this work will be of importance in giving exact information upon the results which may be expected in these different typical forms of construction, and in working out a plan of storage for the small grower which will give as satisfactory results as the large commercial storage.

APHIDS ON LONG ISLAND POTATOES

H. R. Talmage

At the time of the Long Island Potato Tour, June 25-27, the fields from a distance looked white from the mass of blossoms. It is hard to imagine fields looking better. There was almost a perfect stand. The vines were filling the rows. There had been abundance of rain and very favorable weather. A good rain during the night of June 25 seemed almost to insure a big crop. With the

exception of a few very light local showers there has not been any rain until August 9 when there was a nice shower of .85 inch. The drought was definitely broken by 1.6 inches of rainfall on August 12. During most of the drought period there were strong drying winds from the North.

The question is often asked by potato growers from other sections how the Long Island potato soils stand dry weather. This question was answered this summer. WHERE THERE WERE NO COMPLICATIONS the late crop came through the drought in fairly good shape. At present time, two weeks late, the vines are still green and growing, and will produce a good yield. Probably 20 per cent of the Long Island crop are Irish Cobblers and the balance are Green Mountains. The Irish Cobblers were so far advanced that the dry weather did not prevent them from making nearly a normal crop. The dry weather with at least three other contributing factors caused a crop failure over a large part of the area planted with Green Mountains. The three factors that caused the failure were the green and pink potato aphids, the peach aphid and the cucumber flea beetle.

On June 26 some of the regular potato aphids could be found. These multiplied rapidly under the favorable conditions of hot dry weather. About July 9 the second crop of flea beetles begun to appear as usual. In some fields they were so numerous that the leaves dried up because of the large number of holes eaten in them and the vines died. Soon after this or about July 15 the so-called peach aphids became quite noticeable on both potatoes and cauliflower. These are two important crops on Long Island.

With the potato leaves full of holes made by the flea beetle and the plants making no new growth and the two kinds of aphids covering what foliage there was left, when the rain came on August 9 the plants were either dead or so near dead that they did not recover and the crop is a failure.

While the drought was general and the crop all over the Island will be cut over a considerable portion of it, the crop will be fair because the aphids were not so abundant and they were destroyed sooner by their parasites. The question naturally arises, why should aphids be more severe in some sections than in others? In those sections where the largest percentages of the total area of each are in, potatoes have suffered the most from the aphids and the potato plants are practically all dead. The sections that have suffered the least and where the potato vines are still green and growing are those sections in which smaller percentages of the whole area are devoted to potato production.

In the sections where the potato crop was ruined by the aphids, at least half of the acreage of cauliflower is also ruined by the aphids beyond recovery. While in the sections where the potatoes were not killed by the aphids, the cauliflower crop was free from aphids, these crops are looking good.

Which caused the crop failure, dry weather or aphids? We can-

not make it rain when we need it. Can we control the aphids? So far as we know here, there is no successful method in general use anywhere.

Some of our growers have controlled the aphids on cauliflower by constant spraying with a solution of "Black Leaf 40." These were small plants, less than a foot high. It is a very different proposition to cover a tangled mass of potato vines.

BIN RUN VERSUS FULLY CERTIFIED SEED POTATOES

J. Tucker

There was an interesting experiment tried out in a small way last fall by some northern seed growers in shipping a few car lots of seed as "bin run." The seed was to be from fields that passed both field inspections given by the Division of Botany, Ottawa, and was to be free from tuber diseases except slight common scab and rhizoctonia. The potatoes were to be taken as they came straight from the bin all sizes from 2 ozs. up. The "bin run" seed was sold at $1.25 per 90 lb. sack (untagged except for grower's tags) against $1.75 per 90 lb. sack for "Fully Certified Extra No. 1" tagged with the Division of Botany tag. The writer has interviewed several of the men who had purchased this "bin run" seed this spring and nearly all of them were of the opinion that it would be better to pay the extra 50 cents a bag for the "Fully Certified" seed as the "Bin Run" contained too many over sized, cut and bruised tubers as well as some frozen potatoes, etc. They were not as good as the "Fully Certified" seed. Others did not have any serious complaints to make but wanted some guarantee that the seed would be inspected before shipping by an official of the Department, to make sure that nothing but seed that had passed field inspections went into the cars. My personal opinion is that it is a dangerous practice to purchase seed potatoes as "bin run." For one thing it is practically impossible for an inspector to pass a whole large bin of potatoes as being "free from disease except scab and rhizoctonia" as he can not see more than a small percentage of them at that time. Whereas with the "Fully Certified" in Ontario he usually opens one bag in five at the car door and has an opportunity to check up much more closely that way. There are several other reasons, too numerous to mention here but very apparent to the man who knows potatoes and has seen what these "bin run" shipments contain. My advice to the purchaser is to pay the extra price and have the best obtainable.

ANNUAL MEETING OF THE VERMONT CERTIFIED SEED POTATO GROWERS' ASSOCIATION

Alfred H. Gilbert

The fifth annual meeting of the Vermont Association was held at Randolph Center on August 6, where five years ago the organization was formed. Two hundred growers were present. The program consisted of a field tour in the morning and the annual business meeting and addresses in the afternoon. Dr. W. H. Martin, Ex-President of the Potato Association of America, was present and spoke on the potato situation in New Jersey. He also congratulated Vermont growers on the natural advantages which this state enjoys for the growing of high grade seed. Mr. J. M. Hurley, Secretary of the New York Co-operative Potato Association Inc., spoke on the marketing of certified seed, and Dr. H. A. Edson of Washington also contributed some valuable suggestions.

Action was taken at this meeting recommending that the maximum percentage allowance for mosaic and leaf-roll at the first inspection be reduced from five per cent each to three per cent. In this action Vermont is adopting the recommendation of the committee on seed certification of the Potato Association of America. Vermont is the first one of the Eastern States to adopt such high standards.

Dimock Orchard Tour. On the day before the state meeting a very unique and sucecssful potato tour and conference under the auspices of the Dimock Orchard was held at Bradford, Vermont. Potato experts from out of the state, together with county agents and local growers of Vermont, constituted a large gathering which visited the 100 acres of certified potatoes being grown by Julian A. Dimock and enjoyed the hospitality of the Dimock Orchard Corporation. Talks were made by Dr. A. W. Gilbert of Massachusetts, Commissioner of Agriculture Felker of New Hampshire, Inspectors H. L. Bailey and A. H. Gilbert of Vermont, and others. The recommendation of the Association for next year with reference to disease control and the maintenance of disease free stock include the plan that every grower shall establish and maintain a seed plot isolated from the commercial field and from other potato fields, where thorough roguing shall be practiced and all measures taken to secure the best possible seed for local planting. It is believed that only in this way can the local strains of seed be kept sufficiently free from disease to serve as foundation stock.

THE CLAY COUNTY POTATO SEED INSPECTION TOUR

E. A. Stokdyk

The writer, together with Prof C. L. Fitch, of the Iowa State

College, was invited by the Moorehead Commercial Club to inspect the Clay County Potato Seed crop. A two-day tour was arranged by these men to include the leading potato sections in the county. Stops were made in fields including Glyndon, Hawley, Barnsville, Sabin, Moorehead, and other points.

As a whole there promises to be some very good seed potatoes in Clay County. Some exceptionally fine fields were visited that were practically free from disease and apparently entirely free from mixture with other varieties. These same fields showed good vine vigor and desirable characteristics for seed. Many fields were visited that were reasonably free from disease, yet contained mixture with other varieties. These fields could be greatly improved for seed purposes by roguing out the mixtures and the few diseased plants that are in them. The certified fields showed less disease than non-certified fields and as far as could be seen no varietal mixture. Since seeing the Minnesota Certified fields, the writer has increased respect for the Minnesota Certification and believes that it is working both to the advantage of the producer and the consumer. Freedom from disease and varietal purity mean much in seed potatoes and the certified fields show superiority in these respects.

A few growers' fields were seen who had made a practice of using a seed plot. These fields that were planted from seed plots showed fewer weak plants than the fields that were not planted from seed plots. It was a good demonstration of the importance of every grower using a seed plot.

Very little scab was noted in the fields with the exception of some of the fields that were planted on the light and sandy types of soil. In some of the heavier soils and older fields rhizoctonia was beginning to develop on the tubers. It will perhaps be wise to dig these fields first to avoid the heavy deposit of black scurf on the tubers.

The tour has been of great interest and instruction to the writer. Many growers' fields were visited who have supplied seed to Kaw Valley Growers and it was interesting to visit the farms of men whose names we hear in the Kaw Valley.

The soil and climate in the Red River Valley are particularly well adapted to seed production and with a little work the growers can make a reputation for it as one of the best seed sections in the United States.

ANNUAL WESTERN NEBRASKA POTATO TOUR

H. O. Werner

The annual potato tour was held in western Nebraska on August

12 to 15. The certified seed industry received the greatest attention throughout the course of this tour. One of the most impressive facts throughout the course of the tour was that the western Nebraska crop of certified Triumph seed potatoes will be very much smaller than it has been for the last two seasons. This is the result most largely of reduced acreage due to the low price prevailing last year and to low yields that seem unavoidable now because of the prolonged period of dry weather.

One half day was spent at the Scotts Bluff county experiment farm. Some of the experimental results being secured on this farm will probably be of interest to people outside of the state. The U. S. Dept. of Agriculture through the superintendent of the experiment farm, Mr. James A. Holden, is conducting an extensive series of crop rotation experiments under irrigation conditions. Potatoes are one of the crops in 13 rotations. These rotations vary from one in which potatoes are grown as a continuous crop, to seven year rotations where potatoes are grown during one of the years. The rotations include applications of manure and some of them include two or three years of alfalfa. The plot which has been cropped to potatoes continuously for 13 years has not produced any marketable potatoes for quite a number of years. The potato vines on this plat never attain very great size and generally die down during the early part of September. The potatoes produced are invariably scabby. This is an entirely impossible crop procedure under the conditions that prevail. As the rotations are lengthened to two, three, and four years, the yield increases a little and the quality improves slightly, but none of the short rotations have sufficient merit to cause them to be recommended to anyone. A considerable gain is generally realized when manure at the rate of twelve tons to the acre is added to the four-year rotations. By far the most worthwhile rotation is one in which there occur three years of alfalfa, followed by potatoes which in turn are followed by sugar beets for two years and then a crop of small grain which is used most largely as a nurse crop for establishing the alfalfa. Manure is used in this rotation on one of the two beet crops. The yields in this rotation are always very high and the potatoes are of exceptional quality, there being very few scabby potatoes. Growing conditions are so good that the vines practically never mature naturally but are killed by the early fall frosts.

Dr. R. W. Goss, of the Dept. of Plant Pathology of the University of Nebraska, is conducting some experiments in western Nebraska for the purpose of studying the symptoms of the various degeneration diseases and the manner of their transmission under western Nebraska high altitude, bright sunshine conditions, both on dry land and under irrigation. This year plants known to have mild mosaic have seldom shown any mosaic symptoms. Mottling was practically absent the entire season. The more advanced types of mosaic causing abnormal leaf growth such as rugoseness,

could be detected somewhat more readily. Plants affected with rugose mosaic are quite decidedly dwarfed and the yields will be considerably reduced. The effect of temperature upon the mosaic symptoms was called to the attention of those present, as was the fact that spindle tuber symptoms seem more noticeable in periods of warm weather such as have prevailed this season.

The writer has been conducting some studies during the last two years to determine the extent to which the spindle tuber is transmitted under western Nebraska conditions. The disease has been transmitted in a number of ways. One of the most striking experiments in the plats is one showing transmission by tuber grafts in 1923. The progeny of all of the normal halves, which were grafted onto spindle tuber halves in 1923, are this year showing spindle tuber characteristics as severe as the original spindle tuber stock. The normal halves used as checks are continuing to be normal and vigorous.

During 1923 a number of normal potato plants were grown alternately with spindle tuber plants. The seed of plants in which the normal plants were caged in 1923 are this year producing only normal, vigorous plants. On the other hand the tubers produced on plants which were alternated with spindle tuber plants without caging in 1923 are this season showing a high percentage of rather advanced spindle tuber symptoms. The lots which were planted among supposedly normal plants in irrigated and dry land fields are showing only a small percentage of spindle tuber. It seems quite evident from these results that under western Nebraska conditions the spindle tuber disease is transmitted from plant to plant through the atmosphere but that there is no transmission between underground parts.

In another series of experiments, normal plants which were alternated with spindle tuber plants were harvested at intervals beginning August 10th. The plants raised from potatoes harvested early last year are showing practically as much spindle tuber disease as those harvested later. In another experiment in which plants were caged commencing at different periods throughout the season, it seems that there is just as much spindle tuber disease in the plants caged as early as July 10th as occurs in the progeny from plants caged at later dates. Plants which were caged the entire season are producing normal progeny this year. Evidently the spindle tuber transmission took place very early in the season in 1923 and was also transmitted to the newly formed tubers very early in the season.

It might be well to add here that the 1923 season was very abnormal in western Nebraska in that vines were relatively more rank than normally, due to the unusually large amount of rainfall. Conditions were also more favorable for insect life. The agent carrying these degeneration diseases has not yet been definitely determined. It does not seem reasonable to consider the aphids as

the sole carriers. Normally only a few aphids are found on very occasional plants in western Nebraska fields. In the very favorable season for aphid development,—in 1923,— a very careful search revealed very few aphids present in potato fields.

Throughout the potato tour it was quite evident that the certified seed growers in Nebraska have mosaic relatively well in hand. As mentioned before, the mild forms which affect the yield but little, are difficult to detect. On the other hand the more severe types such as rugose mosaic and combinations resulting in curly dwarf, are almost entirely absent. These later types when present could be seen quite distinctly by trained observers.

The special precautions taken to check up on the mosaic content of the Nebraska seed stocks, are apparently functioning as expected. Trial plats are planted in Louisiana in February and in western Nebraska in May. Samples of seed potatoes certified or entered for certification are planted in these plats. Critical mosaic readings are made in Louisiana in April and in western Nebraska during the first few days in July. Prior to these periods the temperature has generally been relatively low and mosaic symptoms could easily be noticed. If any lots of potatoes show a high percentage of mosaic in these trial plats they are eliminated so far as further consideration for certification is concerned. By this means the certification agency is quite certain that they will not be certifying lots containing a serious amount of mosaic, which is always a danger when the weather is very warm during the inspection season and when only field inspection records are considered.

The Nebraska potato tour was attended by Prof. G. L. Tiebout of Baton Rouge, La., and representatives of five railroads that are interested in the seed potato business. The Board of Directors of the Nebraska Certified Potato Growers Co-operative are planning to supply the Extension Service of the University of Louisiana with one or two carloads of certified Triumph seed potatoes to be used for demonstrational work among boys and girls garden and potato clubs in the state of Louisiana. While they anticipate no difficulty in disposing of the 1924 crop of certified seed—to good advantage—they realize that undoubtedly in the near future the production of certified seed will increase considerably and that by this method sufficient advertising will have been done to assure a good market for a large crop.

The potato crop in western Nebraska will probably be below normal this season in both irrigated and dry land sections. In the eastern part of the state the early crop has been one of the largest so far as per acre production is concerned, that has ever been produced. At the Experiment Station at Lincoln, yields of 300 bushels and more per acre were produced with the Early Ohio variety. The writer has seen some fields of Irish Cobbler potatoes on the Platte Valley bottoms which will probably yield 400 bushels per acre. These unusual yields in eastern Nebraska are due to the cool

weather and large amount of rainfall which occurred throughout the spring and summer up until about the first of August.

THE DIMOCK ORCHARD FIELD DAY

Julian A. Dimock

The Potato Field Day held on August 5 at the Dimock Orchard began its program at Bradford, Vermont, with the inspection of a 27-acre field of the D. O. Strain Sixteen of Green Mountains. At this field 150 interested growers, county agents, buyers, pathologists and other guests watched demonstrations of different types of dusting machines and of the roguing system in force on the Dimock Orchard fields and listened to a brief discussion of seed potato production, by Professor A. H. Gilbert of the University of Vermont.

Twenty-four acres of the same strain on lighter soil on the other side of town furnished an interesting opportunity for the ocmparison of similar stock under different conditions.

While the fine construction of the potato storage house was a point of technical interest to many of the guests, the potato luncheon which was served there was probably more popularly understood and enjoyed. The menu included potato salad, potato chips, potato bread rolls, potato doughnuts, potato flour sponge cake, potato chocolate cake, candy made with mashed potato and candy potatoes.

In the afternoon the tour crossed to the fields in Pike, New Hampshire, and the members were entertained at the Lake Tarleton Club by Mr. E. Bertram Pike, who is president of the Dimock Orchard Seed Potato Corporation and who is also a cordial and delightful host. After a dip in the lake and tea on the wide piazza, the guests enjoyed a number of short talks on various phases of the production of seed potatoes. Among the speakers were Dr. H. A. Edson of Washington, Professor J. S. Owens of Storrs, H. L. Bailey of the Vermont certification service, E. W. Abbott, General Freight Agent of the Boston and Maine Railroad, and Commissioner Felker, who also emphasized the unrecognized opportunities that lie in New England farming.

After this the guests adjourned to South Newbury, Vermont, where a waffle supper was served in the garden at Twinflower, which is known for its various maple products. Concluding the day's program was a moving picture entertainment featuring the U. S. D. A. films of potato culture.

The real significance of the day lies in the better understanding and sympathy with each other's problems developed between the many growers and buyers who came together at this Field Day.

A TWO THOUSAND MILE FLIVVER TOUR IN POTATO SECTIONS OF TEN EASTERN STATES

J. M. Hurley

The writer recently visited the principal potato growing sections in ten eastern states, and will set down here some of his random observations. Eastern New York has a better than an average crop. In central Vermont, many fiields show incomplete stands but are making excellent growth. In southern New Hampshire and eastern Massachusetts the stands observed are generally poor. Around Providence, Rhode Island, the early crop was good and the late varieties are making a satisfactory growth. In eastern Connecticut the late crop was killed prematurely by drought but in some sections the late plantings of Green Mountains retained enough vigor to profit by the rains, August 9 and 12. In northern New Jersey and eastern Pennsylvania the crop was injured by too much rain followed by the July drought but promises to make a good yield. In central Jersey the Irish Cobblers were an excellent crop, both as regards yield and quality. The late crop will contain a considerable percentagle of small tubers — 10 per cent to 15 per cent. Shippers of New Jersey potatoes are paying more attention to grading and sorting than ever before. In Delaware and Maryland, the potato crop was injured more by the excessive rains early in the season than by the subsequent drought. The growers who used certified seed will have good crops. But the practice of using good seed is not so general in these states as in the other sections visited. The only late blight observed on this trip was found in Baltimore County, Maryland. Most growers and dealers interviewed are looking forward to better prices by the middle of September. In every section visited, certified seed is showing up conspicuously better than home grown or common northern grown seed.

THIRD ANNUAL MINNESOTA POTATO TOUR

August 5 - 9, 1924

A. G. Tolaas

During the past three or four years considerable interest has been manifested in the growing of potatoes on the peat lands of the state, and inasmuch as our past tours had included practically nothing but mineral soils, we decided to give this year's itinerary over to those sections where peat had been given a fair chance to show what could actually be grown on such a type of soil.

On Tuesday morning four big busses left Minneapolis loaded to the limit for Hollandale, about 100 miles south from the former

place. Hollandale is an inland town located about ten miles north of Albert Lea, almost due south of the Twin Cities. Five years ago the town with its surrounding 15,000 acres was a combination of lake and marsh where the Mallard and others of his tribe used to furnish excellent hunting for the upland farmers in that vicinity and for city and townsfolk, who in certain times of the year were seized with a desire to have roast wild duck for dinner. Now in place of a lake where wild rice and cat-tails were the only crops five years ago, we saw prosperous farms owned and operated chiefly by Hollanders. Most of them are raising Irish Cobblers for certification, a total of approximately 500 acres being under inspection. It was impossible to stop at all of the farms but enough representative fields were visited so as to give those present an idea of what is being accomplished with potatoes at Hollandale.

The tourists journeyed to Purgatory Springs in the Lake Minnetonka District where Mr. G. R. B. Elliott, formerly connected with the Agricultural Engineering Staff at the Minnesota Experiment Station, explained the work he was doing with regard to various water levels in the production of crops on peat soils. The tourists naturally being interested in potatoes, spent most of the time looking over the potato plots. Water levels are maintained at one foot intervals running from one foot to five or six feet below the surface. There was a very noticeable difference in vine growth on the various plots, the larger and more vigorous plants being produced at the deeper water levels. Each visitor was supplied with a summarized report of the yields of the various crops used in the 1923 experiments. On returning to University Farm, the rest of the forenoon was spent in going over the potato experiments.

A stop was made at the Coon Creek Experiment Farm, where some interesting experiments are being conducted under the direct supervision of Prof. George Nesom of the Soils Division of the Experiment Station. Two types of soil predominate at the Coon Creek Farm; one being dune sand and the other peat. From the results obtained at the Coon Creek Station and from the peat farms visited, it seems quite clearly established that the Bliss Triumph and Irish Cobbler are the best varieties to raise on such soil.

The first stop in St. Louis County was made at the Northeast Sub-Station, where Mr. M. J. Thompson, superintendent, piloted the visitors about the potato plots. The Bordeaux Spray Plots and the stains tests of the Certified Irish Cobblers, Rural New Yorkers and Burbank Russets were of chief interest.

The chief object of the tour was to show what Minnesota growers are doing to raise first-class seed potatoes and what the potato investigators of the state are doing to solve the numerous problems connected with the industry. The committee in charge feels that the 1924 tour was a great success.

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